THURSDAY, APRIL 27, 1871

THE HOPE OF FRANCE

A PAPER which M. Henri Sainte-Claire Deville has recently laid before the Paris Academy of Sciences is in our opinion of such high importance that we make no apology for placing it in original before our readers. It runs as follows :—

"La science a joué un grand et terrible rôle dans les défaites que nous venons de subir. Les découvertes d'Ampère, les travaux de nos mécaniciens militaires ont été cruellement utilisés contre nous. Enfin, l'organisation libérale des universités allemandes a été mise au service de passions haineuses dirigées contre notre pays. Aussi dit-on de tous côtés et avec raison que c'est par la science que nous avons été vaincus. La cause en est dans la régime qui nous écrase depuis quatre-vingts ans, régime qui subordonne les hommes de la science aux hommes de la politique et de l'administration, régime qui fait traiter les affaires de la science, leur propagation, leur enseignement, et leur application par des corps ou des bureaux où manque la compétence et par suite l'amour du progrès.

"Aujourd'hui, messieurs, il est temps d'agiter publiquement les grandes questions. La réserve modeste pratiquée trop souvent par un trop grand nombre des membres de cette Académie serait une faute grave en ce moment, une faute sans excuse.

"Dans des temps calmes beaucoup d'entre nous avaient pu se ménager dans leurs cabinets ou leurs laboratoires cette vie studieuse rendue si douce et si facile par l'éloignement des hommes et de leurs débats intéressés. Il est de notre devoir aujourd'hui d'intervenir tous activement et directement dans les affaires du pays, et de contribuer de toutes nos forces à une régénération par le savoir dont la France exprime partout la nécessité.

"Dans les temps difficiles, le pays a trouvé chez les membres de cette Académie, et dans l'Académie tout entière, le dévouement absolu sur lequel il avait le droit de compter. Nos séances, si bien remplies pendant la durée du siége, en seront un témoignage mémorable. Ces services mêmes, l'autorité morale que nous devons à notre origine qui est l'élection de chaque membre par ses pairs, tout, messieurs, nous oblige de contribuer à cette régénération du pays par l'initiative de chacun, par l'action de la compagnie tout entière.

"J'ai donc l'honneur de proposer à l'Académie d'admettre à l'ordre du jour de ses séances les grandes questions du développement et de l'enseignement de la science en France et toutes les questions d'intérêt général qui concernent la science et les savants.

"Par exemple, la France possède de grands et glorieux corps scientifiques dont quelques membres ont constamment siégé dans cette Académie. Quel service nous rendrions, si nous pouvions faire dépouiller ces grands corps de l'enveloppe politique, administrative ou fiscale qui les étouffe, qui met en péril le recrutement de la science parmi eux et dans les écoles célèbres qui leur servent de pépinières.

"Je le répète; je demande à mes confrères d'élargir le cercle de ses communications et d'y faire entrer toutes les questions d'intérêt scientifique, de quelque ordre et de quelle que nature qu'elles soient, de quelque part qu'elles viennent.

"Des commissions choisies dans nos sections et quelquefois dans les autres classes de l'Institut, devraient préparer, résumer et rédiger au besoin comme des vœux ou des décisions académiques les délibérations de la compagnie.

"Sous cette forme nouvelle, qui exclut toute intervention dans les affaires du gouvernement (car les affaires d'instruction publique ne sauraient plus être politiques), nous ferons arriver les conseils de l'expérience et du savoir, et, j'espère, toutes les vérités utiles à la connaissance directe du pays tout entier."

It is not our purpose to inquire how true may be M. Deville's idea that the success of the German arms has been due to the more vigorous pursuit of science in Germany; but we may remark that it is certain that it is the distinct and emphatic belief of the most eminent scientific men of France: it is our clear duty, however, to inquire whether we are in a better condition in this matter than France was a year ago.

First. Are our men of science subordinated to place-seekers or politicians who, according to M. Deville, lack competence, and therefore the love of progress? It is a question even whether we have even reached this stage! In England there is absolutely no scientific organisation whatever, no minister whose duty it is to care one jot for science, no one man in office to whom either scientific instruction or the advancement of science is of the least interest—unless, perhaps, we except Mr. Lowe, and we all know in what point of view he from time to time turns from his more important avocations to deal with such questions.

So that on this point there is no comparison between the two countries. The French have an organisation, the working of which, according to their own showing, has been entrusted to incompetent politicians. We have no organisation whatever—which, perhaps, is a blessing, if we should be compelled to imitate the French plan—but we very often have to pay very dear for blessings, and this certainly is one which the sooner we get rid of the better.

Let us now pass from the disease to the remedy. M. Deville proposes that the French Academy should at once take up all large questions connected with the advancement and teaching of science (and we are glad to see that M. Deville does not put the cart before the horse, as is too much the fashion here) in order to liberate it from the political, administrative, and fiscal fetters which now paralyse it and to enable the country to make the most of every scientific idea or effort.

As we understand this proposal, M. Deville wishes that the Academy of Sciences should interest itself not only in abstract Science, and in the teaching of abstract Science, but in all the scientific inquiries or departments of all branches of the administration. To what extent interference is proposed in this latter case we have as yet no means of knowing, but it is easy to see that the further this goes the better it will be for the nation. Two matters which have recently occurred in England, to which we may refer parenthetically, will, we venture to think, strengthen our assertion. We shall not be contradicted when we state that if the Scientific Committee recently appointed by the Admiralty—a Committee which contains among its members Profs. Sir Wm. Thomson and Rankine—had been in existence when the *Captain* was built, instead of being appointed after that costly ship had simply turned bottom upwards because it was top heavy, we should now be the richer of a noble ship and five hundred men. And yet—and yet—we believe this Committee is only a temporary one. Take another case: A Commission was recently appointed to inquire into the Education of the Army. Was there a man of Science upon it? Certainly not. And what was one of the first

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things that came out of that Commission's report? This, namely, that most of the teachers of Science in the Army Schools received notice to quit. England, on the high authority of Lord Northbrook, did not want a Scientific Army.

All this by the way. We have referred to these instances, in order to show that the various departments of the Administration want scientific control here as is in France—that M. Deville's suggestion is of value here as there.

Now, assuming that the suggestion is a vital one, or even that it is an important one, and that it is good for England as for France, and we shall gladly open our columns to a discussion on these points; the question arises—is it possible to adopt it here?

We are met at once by the different conditions of the French Academy of Sciences, and our own Royal Society. The Academy is a large paid body; our Royal Society is a small unpaid body, and the work, which M. Deville considers so necessary for the regeneration of France, and which many consider necessary for the salvation of this country, is no temporary or small affair. The labour would be great, enormously great at first, and, moreover. would be a never ending one. To impose such a labour as this on a private body, which was constituted for entirely different purposes, would simply be to destroy that private body altogether, and it would be both unwise and unjust for such a body to undertake it, unless each member had ample means and no occupation. so that all his time and energy might be devoted to the task.

We think, then, that for these and for other reasons, not far to seek, it is impossible for our Royal Society to play permanently the *rôle* here which M. Deville has suggested to the Paris Academy.

But here, at length, is a grain of comfort. We have in England, at the present moment, a body at work, which if the general ideas of the power entrusted to it be correct, may perform those very services for England which M. Deville so loudly calls for—a call which all men of science *d'outre manche* re-echo—in the case of France. We refer to the Royal Commission on Scientific Instruction and the Advancement of Science, on which body, we take it, has devolved just such a general overhauling of all matters scientific within these realms as M. Deville has proposed—a herculean task, but a noble one if done well, and a task which will not be well done unless it is indicated how England can be put in a position second to no other nation so far as Science is concerned, a position that she certainly does not occupy at present.

But supposing all this done, we must have something more. We must have some permanent machinery, and having this we must have the scientific men mindful, above all other things, of the interests of science, and then our politicians will hear no uncertain sound as to the merits or demerits of State aid to the higher education. A nation, as a distinguished foreign *savan* has recently said, must endow science until that nation stands first (1) in abstract Science, (2) in the applications of Science generally, and (3) in the amount of knowledge possessed by State servants of all classes. When she has achieved this point the question of continuing State aid may properly be discussed—not till then. To this let us add that apart from the question of State-aided Science that nation will stand highest which, in addition to the above conditions, calls into her councils her men of Science, and becomes a Science-aided State.

EDITOR

PANGENESIS

IN a paper, read March 30, 1871, before the Royal Society, and just published in the Proceedings, Mr. Galton gives the results of his interesting experiments on the inter-transfusion of the blood of distinct varieties of rabbits. These experiments were undertaken to test whether there was any truth in my provisional hypothesis of Pangenesis. Mr. Galton, in recapitulating "the cardinal points," says that the gemmules are supposed "to swarm in the blood." He enlarges on this head, and remarks, "Under Mr. Darwin's theory, the gemmules in each individual must, therefore, be looked upon as entozoa of his blood," &c. Now, in the chapter on Pangenesis in my "Variation of Animals and Plants under Domestication," I have not said one word about the blood, or about any fluid proper to any circulating system. It is, indeed, obvious that the presence of gemmules in the blood can form no necessary part of my hypothesis; for I refer in illustration of it to the lowest animals, such as the Protozoa, which do not possess blood or any vessels; and I refer to plants in which the fluid, when present in the vessels, cannot be considered as true blood. The fundamental laws of growth, reproduction, inheritance, &c., are so closely similar throughout the whole organic kingdom, that the means by which the gemmules (assuming for the moment their existence) are diffused through the body, would probably be the same in all beings; therefore the means can hardly be diffusion through the blood. Nevertheless, when I first heard of Mr. Galton's experiments, I did not sufficiently reflect on the subject, and saw not the difficulty of believing in the presence of gemmules in the blood. I have said (Variation, &c., vol. ii., p. 379) that "the gemmules in each organism must be thoroughly diffused; nor does this seem improbable, considering their minuteness, and the steady circulation of fluids throughout the body." But when I used these latter words and other similar ones, I presume that I was thinking of the diffusion of the gemmules through the tissues, or from cell to cell, independently of the presence of vessels,—as in the remarkable experiments by Dr. Bence Jones, in which chemical elements absorbed by the stomach were detected in the course of some minutes in the crystalline lens of the eye; or again as in the repeated loss of colour and its recovery after a few days by the hair, in the singular case of a neuralgic lady recorded by Mr. Paget. Nor can it be objected that the gemmules could not pass through tissues or cell-walls, for the contents of each pollen-grain have to pass through the coats, both of the pollen-tube and embryonic sack. I may add, with respect to the passage of fluids through membrane, that they pass from cell to cell in the absorbing hairs of the roots of living plants at a rate, as I have myself observed under the microscope, which is truly surprising.

When, therefore, Mr. Galton concludes from the fact that rabbits of one variety, with a large proportion of the blood of another variety in their veins, do not produce mongrelised offspring, that the hypothesis of Pangenesis is false, it seems to me that his conclusion is a little hasty. His words are, "I have now made experiments of trans-

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